

REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)				APPROVED				
A	Add device type 02. Technical and editorial changes throughout.										94-02-07				M. A. Frye				
THE FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.																			
REV																			
SHEET																			
REV																			
SHEET																			
REV STATUS OF SHEETS				REV		A	A	A	A	A	A	A	A						
				SHEET		1	2	3	4	5	6	7	8						
PMIC N/A				PREPARED BY Marcia B. Kelleher						DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444									
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A				CHECKED BY D. A. DiCenzo															
				APPROVED BY N. A. Hauck						MICROCIRCUIT, LINEAR, QUAD DIFFERENTIAL COMPARATOR, MONOLITHIC SILICON									
				DRAWING APPROVAL DATE 87-09-14															
				REVISION LEVEL A						SIZE A		CAGE CODE 67268		5962-87659					
						SHEET 1 OF 8													

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

<u>5962-87659</u>	<u>01</u>	<u>C</u>	<u>X</u>
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	TLC374M	Quadruple differential comparators
02	TLC139M	Quadruple differential comparators

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
C	GDIP1-T14 or CDIP2-T14	14	dual-in-line
2	CQCC1-N20	20	square chip carrier

1.2.3 Lead finish. The lead finish shall be as specified in MIL-STD-883 (see 3.1 herein). Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings. 1/

Supply voltage (V_{DD}): 2/	
Device type 01	18 V dc
Device type 02, range	-0.3 V dc to 18 V dc
Differential input voltage (V_{ID}): 3/	
Device types 01 and 02	± 18 V dc
Output voltage (V_O):	
Device type 01	18 V dc
Device type 02, range	-0.3 V dc to V_{DD}
Input voltage (V_I):	
Device type 01	V_{DD}
Device type 02, range	-0.3 V dc to V_{DD}
Input current (I_I):	
Device type 02	± 5 mA
Output current (I_O):	
Device type 01	20 mA
Device type 02, each output	20 mA
Duration of output short circuit to GND: 4/	
Device type 01	Unlimited
Total supply current into V_{DD} terminal (I_{DD}):	
Device type 02	40 mA
Total current out of GND terminal (I_{GND}):	
Device type 02	60 mA

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ All voltage values, except differential voltages, are with respect to network GND terminal.

3/ Differential voltages are at the noninverting input terminal with respect to the inverting input terminal.

4/ Short circuits from outputs to V_{DD} can cause excessive heating and eventual destruction.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 2

1.3 Absolute maximum ratings - Continued. 1/

Storage temperature range	-65° C to +150° C
Maximum power dissipation (P_D), device type 01 <u>5/</u>	500 mW
Continuous total power dissipation (P_D), device type 02 <u>6/</u>	1375 mW
Lead temperature (soldering, 10 seconds), device type 01	300° C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds, case outline C, device type 02	300° C
Case temperature for 60 seconds, case outline 2	+260° C
Junction temperature (T_J)	+150° C
Thermal resistance, junction-to-case (Θ_{JC}):	
Case outline C	See MIL-STD-1835
Case outline 2	See MIL-STD-1835

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A)	-55° C to +125° C
Supply voltage (V_{DD})	4 V dc to 10 V dc
Common-mode input voltage (V_{IC})	0 V dc to V_{DD} - 1.5 V dc
Low-level output current (I_{OL}), device type 02	20 mA

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-I-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standards, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

5/ For T_A = +100° C to +125° C, derate linearly at 12 mW/° C.
6/ For temperatures above +25° C, derate at 11.0 mW/° C.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 3

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-I-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-I-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-I-38535 is required to identify when the QML flow option is used.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections and logic diagram. The terminal connections and logic diagram shall be as specified on figure 1.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-EC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-EC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 4

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions ^{1/} -55° C ≤ T _A ≤ +125° C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input offset voltage ^{2/}	V _{IO}	V _{DD} = 5 V, V _{IC} = V _{ICR} min	1	01		10	mV
			2, 3			12	
		V _{DD} = 5 V to 10 V, V _{IC} = 0 V to V _{DD} - 1 V	1	02		5	
		V _{DD} = 5 V to 10 V, V _{IC} = 0 V to V _{DD} - 1.5 V	2, 3			10	
Input offset current	I _{IO}	V _{DD} = 5 V	2	01		10	nA
		V _{IC} = 2.5 V		02		15	
Input bias current	I _{IB}	V _{DD} = 5 V	2	01		20	nA
		V _{IC} = 2.5 V		02		30	
Common-mode input voltage range	V _{ICR}	V _{DD} = 5 V	1	01	0 to V _{DD} - 1.75		V
			2, 3		0 to V _{DD} - 2.0		
			1	02	0 to V _{DD} - 1		
			2, 3		0 to V _{DD} - 1.5		
High-level output current	I _{OH}	V _{DD} = 5 V, V _{ID} = 1 V, V _{OH} = 15 V	2, 3	01		2	μA
		V _{DD} = 5 V, V _{ID} = 1 V, V _{OH} = 5 V	1	02		40	nA
			2			1	μA
Low-level output voltage	V _{OL}	V _{DD} = 5 V, V _{ID} = -1 V, I _{OL} = 4 mA	1	01		400	mV
			2, 3			700	
		V _{DD} = 5 V, V _{ID} = -1 V, I _{OL} = 6 mA	1	02		400	
			2			800	

See footnotes at end of table.

**STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444**

SIZE
A

REVISION LEVEL
A

5962-87659

SHEET
5

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions ^{1/} -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Low-level output current	I _{OL}	V _{DD} = 5 V, V _{ID} = -1 V, V _{OL} = 1.5 V	1	01	6		mA
Supply current (four comparators)	I _{DD}	V _{DD} = 5 V, V _{ID} = 1 V, No load	1	01		1	mA
		No load, outputs low	1	02		80	μA
			2, 3			175	
Response time ^{3/}	T _{RES}	R _L connected to 5 V through 5.1 kΩ, C _L = 15 pF, 100 mV input step with 5 mV overdrive	9	01		1300	ns
		R _L connected to 5 V through 5.1 kΩ, TTL- level input step, C _L = 15 pF including probe and jig capacitance	9	01		900	

^{1/} All characteristics are measured with zero common-mode input voltage unless otherwise specified.

^{2/} For device type 01, the offset limits given are the maximum values required to drive the output above 4 V or below 400 mV with a 10 kΩ resistor between the outputs and V_{DD}. They can be verified by applying the limit value to the input and checking for the appropriate output state. For device type 02, the offset voltage limits given are the maximum values required to drive the output up to 4.5 V or down to 0.3 V with a 2.5 kΩ load to V_{DD}.

^{3/} The response time specified is the interval between the input step function and the instant when the output crosses 1.4 V.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 9
Group A test requirements (method 5005)	1, 2, 3, 9
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

*PDA applies to subgroup 1.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 6

Device type	01 and 02	
Case outlines	C	2
Terminal number	Terminal symbol	
1	1 OUT	NC
2	2 OUT	1 OUT
3	V_{DD}	2 OUT
4	2 IN-	V_{DD}
5	2 IN+	NC
6	1 IN-	2 IN-
7	1 IN+	NC
8	3 IN-	2 IN+
9	3 IN+	1 IN-
10	4 IN-	1 IN+
11	4 IN+	NC
12	GND	3 IN-
13	4 OUT	3 IN+
14	3 OUT	4 IN-
15	---	NC
16	---	4 IN+
17	---	NC
18	---	GND
19	---	4 OUT
20	---	3 OUT

NC = No internal connection

(EACH COMPARATOR)

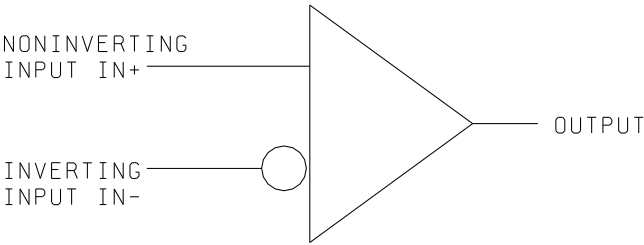


FIGURE 1. Terminal connections and logic diagram.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 7

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, 6, 7, 8, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-STD-883 (see 3.1 herein).

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444-5270, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-EC.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87659
		REVISION LEVEL A	SHEET 8

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 94-02-07

Approved sources of supply for SMD 5962-87659 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-EC. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN <u>1/</u>
5962-8765901CX	01295	TLC374MJB
5962-87659012X	01295	TLC374MFKB
5962-8765902CX	01295	TLC139MJB
5962-87659022X	01295	TLC139MFKB

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

01295

Vendor name
and address

Texas Instruments, Incorporated
P.O. Box 655303
Dallas, TX 75265
Point of contact: I-20 at FM1788
Midland, TX 79711-0448

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.